Space Weather Forecast

Issued on Wednesday, 18 October 2023 at 01:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Weak Coronal Mass Ejection arrivals possible, with a slight chance of isolated G1 Minor Storms intervals throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low, with isolated weak common class flares. Peak flare was from an eruption near a small and now faded sunspot in the southwest, which produced an associated CME (coronal mass ejection). There are three relatively small and simple sunspot regions on the disc, which have remained largely stable. The CME has been assessed as largely missing Earth, ahead and south, but with a chance of a glancing interaction either late day 3 or day 4 (20-21 Oct). No other Earth-directed CMEs occurred in this period.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of background slow wind. The speed of the wind eased from 330 km/s to around 280 km/s. Interplanetary magnetic field (IMF), was weak. The north-south component was also weak and variable. Geomagnetic activity was Quiet (Kp 0-1).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Very Low activity expected at first. There is a slight, but perhaps increasing chance of isolated M-flares through the period, as any development occurs.

Solar Wind / Geomagnetic Activity: There are four CMEs with potential Earth-directed components. Two from the 14th are low confidence, but may combine to give a single glance during the morning of day 1 (18 Oct). A glancing impact is also possible late day 2 or early day 3 (19-20 Oct) from the CME originating from a common class flare on 16 Oct, however the bulk of the material from this CME is expected to miss behind. The eruption from 17 Oct then gives a slight chance of a further glancing impact day 3-4 (20-21 Oct). Otherwise, slow wind conditions are expected to dominate day 1-2, before a likely transition into the fast wind from a small coronal hole, although any enhancement is likely to be limited, easing again day 4. Overall, mainly Quiet geomagnetic activity is expected but with the potential for Unsettled to Active spells, with a very slight chance of G1 Minor storm intervals from any enhancements. The greatest risk is either late day 2 or day 3 if the third CME arrival combines with the fast winds.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background, with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	20	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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